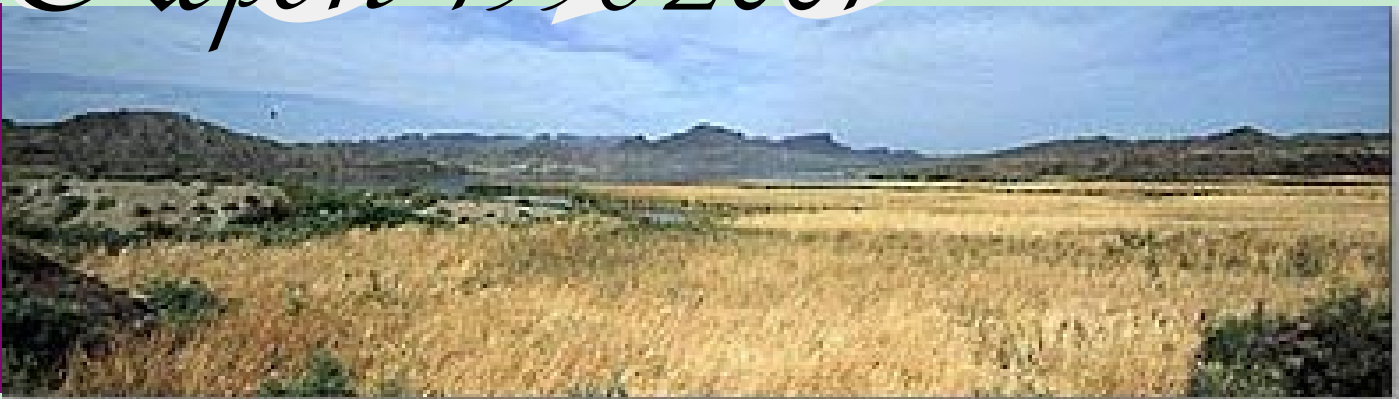


Lower Colorado Region

*Water
Conservation
Report 1996-2001*



Water Conservation Report

Lower Colorado Region

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Water Conservation Report

Lower Colorado Region

The Long View

Five years into the life of a program is a good time to take another long view. Looking back affords a sense of progress and accomplishment for all those goals envisioned at the outset; looking forward provides new resolve to meet the challenges ahead.

The Water Conservation Field Services Program (WCFSP) in the Lower Colorado Region has evolved during the five years since its inception.

- Formal agreements and partnerships with water agencies have evolved into familiar, productive working relationships.
- Technical demonstrations have evolved into implementation programs.
- An initial emphasis on water plans has come to fruition, evolving into a process for reviewing plan updates.
- Water Conservation education efforts have evolved into traditional elements of public school education and the life of desert communities.

Shifting emphasis

In the years preceding the WCFSP, water purveyors conserved water by building better infrastructure—plugging the leaks, to put it plainly. By 1996 when the WCFSP was instituted in fulfillment of the Reclamation Reform Act, most structural improvements to water facilities had been addressed. With the WCFSP the emphasis shifted to improving the efficiency of water management in the home, on the farm and within factories. The prime prospect for significant gains in saved water was to be found in the combination of New Technology with Best Practices.

No one size fit all. In Las Vegas, landscape irrigation for burgeoning suburbs has long been the overriding demand-side issue. In Central and Southern Arizona cities and farms, the State asserts firm jurisdiction over both groundwater and imported surface water as it struggles to balance both. In the desert agriculture along the Lower Colorado River, water users seek solutions for soil salinization, mineralized runoff from the fields, high water consumption, and a finite water supply. In the metroplex of the Southern California coastal plain, water purveyors face significant constraints on the amount of water that can be imported from afar.

Increasingly over the past five years, water conservation has come to be acknowledged by citizens of the Lower Colorado Region as a noble objective, important to sustaining the economy of an arid region. Of course, people don't count themselves as citizens of any Bureau of Reclamation administrative division. They are Californians, Nevadans and Arizonians. They hail from Van Nuys or Imperial, Las Vegas or Tucson, Palo Verde or Pasadena. Yet, for all this diversity what they have in common is a growing awareness of the need to conserve water in the desert.

Working effectively with each locality's sense of identity toward a shared understanding of desert realities has been the real success of the Water Conservation Field Services Program. The name means something: the "field" is where water is used, the "service" is provided to the users. The emphasis of the WCFSP from the beginning has been on working with local people to achieve local water conservation goals.

It was clear from the onset of the WCFSP that all these situations offered opportunities to make better use of existing water supplies through a combination of technology and management.

The past five years represent a maturation of the New Technology plus Best Practices approach. The required knowledge and tools for improving water efficiency are rapidly coming available, and Reclamation incentives have helped to make that happen. The very success of the WCFSP as a contributing catalyst seems likely to shift the emphasis again, as modern water management methods move toward wider adoption. The incentives for water agencies have been gratifyingly successful, as shown by the quotes included in this review. The incentives for *end users*—the people who pay the monthly water bill—might well become the primary emphasis in the next major phase of water conservation's evolution.



Water Conservation Report

What others are saying...

In 1999, USBR provided a three-phase review of Southern Nevada Water Authority's five-year conservation plan, supporting our efforts to create an effective conservation 'road map' to carry us through 2003. Most recently, USBR has provided support for SNWA to successfully extend our conservation education and outreach programs to the Spanish-speaking community in the Las Vegas region. On the horizon, USBR and SNWA are discussing some creative opportunities to partner in other studies that will further enhance our ability to reduce consumptive water use."

Doug Bennett

Conservation Manager, Southern Nevada Water Authority

In 1989, because of old equipment, the Colorado River Indian Tribes (CRIT) suffered a catastrophic failure of its irrigation system and many acres of crops were damaged by the resulting water shortages. In working to correct the problems that led to this failure, CRIT adopted an irrigation system rehabilitation plan and has been strongly pursuing this plan since 1993. CRIT relies on the Federal Government for a large part of this rehabilitation program and the Bureau has stepped up and provided much needed technical and financial support. Reclamation has helped us do what we needed to do to make our irrigation project more efficient and effective in serving the needs of the growers on Reservation lands."

Gary B. Hansen, Director

Water Resources Department, Colorado River Indian Tribes

"With Reclamation's support, the Water Resources Research Center's education program achieved a very successful first annual National Water Education Day water festival for 4th and 5th grade students. Having received comments from every teacher and student involved, we know that the festival was a tremendously successful learning experience... Reclamation sponsored the printing of a new National Project WET (Water Education for Teachers) book called Conserve Water. The book focuses on middle and high school education. The local WCFSP field office has ensured that the Arizona Project WET program was well supplied with these books. They are the main sponsors of Project WET workshops focused on secondary educators. I feel fortunate to have the sponsorship of the Bureau of Reclamation water conservation program."

Kerry L. Schwartz, Education Program Coordinator

University of Arizona Water Resources Research Center

(Also, Statewide Coordinator, Project WET)

Lower Colorado Region

Water Management Planning - *then, now and*

tomorrow

In 1996, water management planning was called “water conservation planning.” It was a tough sell at first but field services staff persisted. Over time, local districts came to appreciate how the planning process resulted in better water efficiency, a bottom line benefit to their own operations. They also came to value Reclamation’s financial assistance for plans that were locally attuned and locally generated. Good planning was good business, and so conservation planning was enfolded into the larger concept of water management. Today and henceforth, water management planning is a standard practice for cities and farms alike, acknowledged for the benefits it provides.

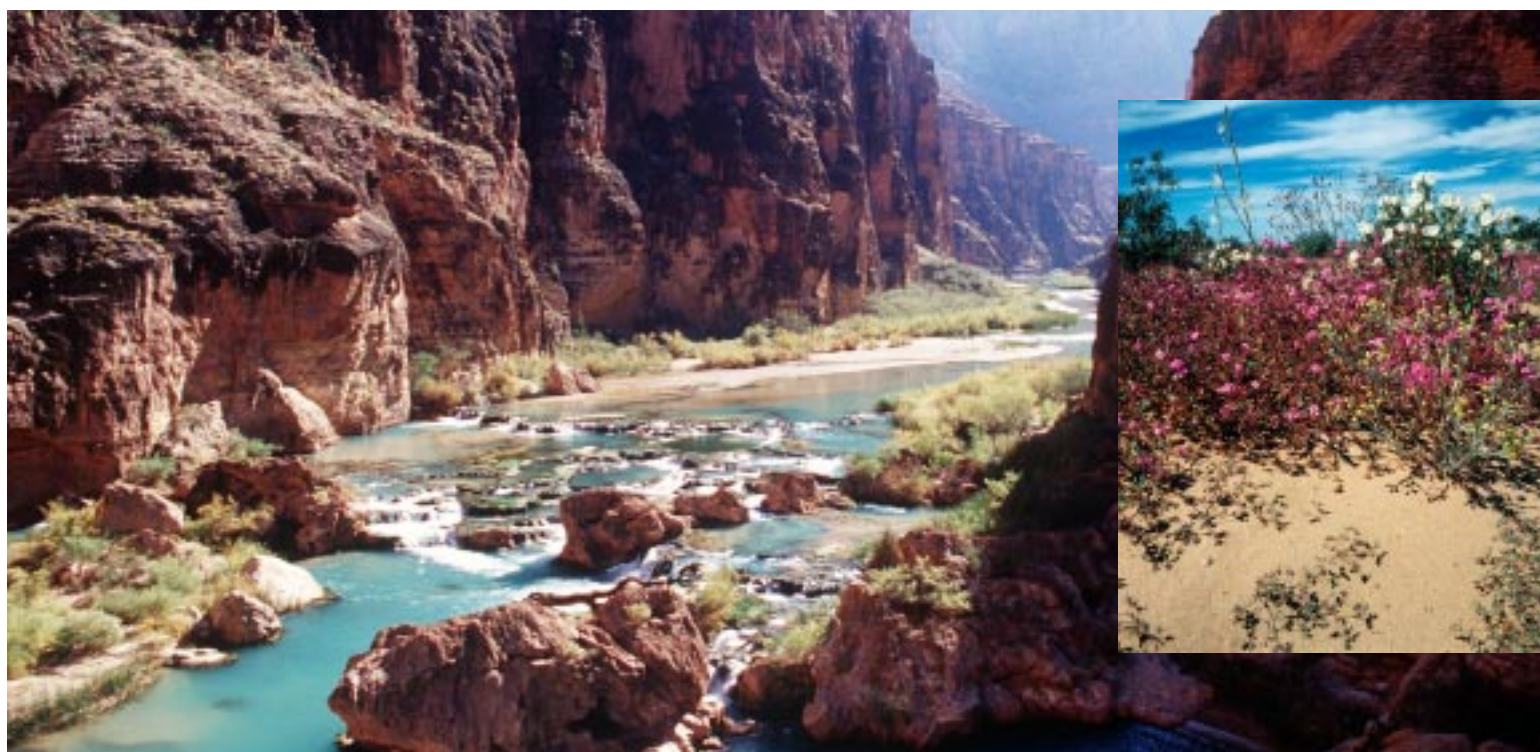
Reclamation’s assistance for water management planning in the region totals \$750,000 for the five years of the WCFSP, an investment that has paid off very handsomely.

Conservation Education - *then, now and*

tomorrow

Five years ago, water conservation education was gathering momentum as a major initiative in schools throughout the arid west, with various non-profit groups providing curriculum materials and teacher training programs. Reclamation in the Lower Colorado Region has contributed its support to these efforts in diverse ways, from underwriting the development of classroom materials and teacher training programs, to sponsoring annual calendars and exhibit booths. The need for water education is perpetual, a key concept in the curriculum of any desert community. Year after year, generation by generation, a cultural commitment to water conservation is steadily accumulating.

Reclamation’s five year sustenance for water-wise messages in the Lower Colorado Region totals \$870,000.



Water Conservation Report

What others are saying...

The Bureau has been the wind beneath the wings of Water CASA from the very beginning. Your support has made it possible for us to be much further along in our impact upon water use in this basin than we would have dared to hope just three and one-half years ago. Your willingness to bear our ideas out and then back them continues to be invaluable to our program efforts. Look at all that you make possible for us: Welcome Packets for all new water customers; Conservation Devices for all new customers in existing dwellings; Publication Printing—we are able to supply our members with the information pieces they need for their customers at any time thanks to your generosity; Dual Metering Program—a first of its scale anywhere, which will have programmatic impact on this region for decades; Water-On-The-Web—another first, a pilot that goes beyond any water consumption information program for customers.”

Val L. Little, Director

Water Conservation Alliance of Southern Arizona

“The Yuma County Water Users’ Association wishes to thank Reclamation for your support in improving the canal delivery system of the Yuma Valley through your Efficiency Incentive Program. Improvements have included the Acoustic Flowmeter at the Colorado River Siphon, the Willet Ramp Flume on the West Main Canal and the Thornton Drop Sharp Crested Weir, also on the West Main Canal. These flow measurement improvements provide continuous monitoring of flows throughout our system, leading to overall improvements in effectiveness and efficiency of water deliveries. We look forward to working with Reclamation in future improvements to our system, notably in implementation of the SCADA System expansion which will further enhance our control and monitoring of flows.”

Donald R. Pope, PE

Manager, Yuma County Water Users’ Association

“When the Xeriscape Conversion Study was developed in 1995, the scope required a significant financial commitment. The ability to co-opt with the Bureau enabled the Water Authority to better justify the effort due to cost sharing. Our study proves to be the largest of its kind in the nation and we are well on our way to finalizing and publicizing the results. Due to its magnitude, this could not have been accomplished without the Bureau’s assistance. The data gathered by the effort has enabled our organization to justify expanding from a xeriscapes study to a full-scale xeriscapes program.”

Janet Rosales, Senior Conservation Programs Analyst

Southern Nevada Water Authority

Lower Colorado Region

Demonstration of Innovative Technologies

- then, now and tomorrow

Over the last five years, new technologies for efficient water management have blossomed, offering cost effective options for municipal, industrial, residential and agricultural users alike. Nevertheless, many potential users need to see these new concepts actually applied in the field before they feel comfortable adopting them. Reclamation assistance has been a critical factor in promoting new technologies during the difficult “start-up” phase. The need for such demonstration assistance will continue in the future.

The Lower Colorado Region support of new water management technology demonstrations for the past five years totals \$1,000,000.



Implementation of Conservation Measures - then, now and tomorrow

The lesson to be drawn from five years of support for water efficiency implementation is that the best argument for change and the greatest obstacle to change are one and the same—the bottom line. For all of the social and environmental good achieved by conserving water, water users themselves need to know that the cost/benefit balance sheet tilts in their favor. Often, Reclamation support has provided such enablement, especially for small districts with limited capital. Any future shifts in market factors, such as use-proportional incentive pricing, would impact the balance sheet and thus influence the effect of financial support.

Reclamation provided \$2,325,000 in cumulative support for implementing conservation measures in the Lower Colorado Region over the last five years.

What others are saying... Continued

"Conservation can help stretch a finite water supply to meet the needs of a growing population in an environmentally beneficial manner... Urban water agencies rely on financial and technical assistance in order to meet increased conservation objectives necessitated by growing demand and constraints on imported water supplies. Matching funds are especially important when the next increment of water conservation is just beyond the local level of cost effectiveness. Metropolitan and its member agencies are committed to the expansion and continued success of the projects that were made possible with Bureau funding. We encourage the Bureau to continue its active support of new and innovative urban water conservation projects in southern California and throughout the western states."

Ronald R. Gastelum

Chief Executive Officer, Metropolitan Water District





The Major Theme: Adopting a Desert Aesthetic

The five year arc of progress for the LCRA curves like a rainbow after a desert thundershower. Follow that rainbow to its "end" and what you find is desert. Here is the pot of gold, gleaming all around.

The fundamental shift for water users in the LCRA has been toward a desert aesthetic, where water is used more sparingly for pleasing results. In the suburbs of Las Vegas and the campgrounds of Lake Mead, desert compatible vegetation is becoming a landscaping standard, still strongly evoking the ambiance of oasis. Landscapers will have a greater variety of low-water trees, shrubs and groundcovers to choose from, thanks to Reclamation research grants. The ever increasing number of motivated citizens will have information sources and demonstration gardens to consult, owing to Reclamation funding support. A shift in public perception has been set into motion, still requiring a frequent nudge but gathering a momentum of its own. People are realizing that a water-wise oasis is both possible and desirable.

Below is a chronicle of progress for the diverse LCRA programs in water planning, education, research, demonstration and implementation. Some programs require a recurring presence from year to year, some evolve to conclusion. You can track both the dedicated persistence and the steady advances over time.

Lower Colorado Region

Lower Colorado Region Area Office

CONSERVATION AND PLANNING ASSISTANCE

There are 32 water service contract holders in the LCRA. Of these 32 urban water users, 14 are required under the Reclamation Reform Act of 1982 to develop and implement water conservation plans. These 14 water users have completed water conservation plans, with technical and financial assistance provided by Reclamation. The plans will be evaluated and updated for further implementation on a 5-year basis.

On March 16, 2000, the Southern Nevada Water Authority, an organization of seven urban water users located within the LCRA, received the 1999 Commissioner's Award for Water Conservation Planning in recognition of development and implementation of its 1999 water conservation plan and water conservation goals set and achieved.

INFORMATION AND EDUCATION

Activity Booklets and Educator's Guide

The LCRA has sponsored several student activity booklets aimed at fourth grade students with The Watercourse and International Project WET. The booklets are included as inserts in *Wild Outdoor World* magazine. Topics have included water conservation, big rivers, and the Colorado River watershed. These inserts have been provided to Project WET participating schools in southern Nevada and northern Arizona. An educator's guide on the Colorado River watershed is currently in development and will be provided to local teachers for use in the classroom.

Project WET Workshops

Since 1998, the LCRA has sponsored four Project WET workshops per year for southern Nevada school teachers. These workshops focus on the entire Project WET curriculum, with

special emphasis on water conservation and management.

Completion of the workshops allows teachers to become facilitators of Project WET, able to teach the curriculum in their own classrooms.

Kids Day

The LCRA participates in the Lower Colorado Region's Annual Kids Day by providing a conservation exhibit and handouts for approximately 100 children annually.

Water Education Calendar

From 1998 to 2001, the LCRA served as a co-sponsor of Nevada's Annual Water Education Calendar. Copies of the calendar are provided to all elementary and junior high school classrooms throughout the State.

Water Force 2020 Interactive Software

In 1999, the LCRA contracted with the Denver TSC visual presentations group to develop an interactive water conservation software game tailored to southern Nevada's water issues. Entitled "Water Force 2020", the software game was installed in five kiosk stations at the Hoover Dam Visitors Center in 2000 for use by the visiting public.

Backyard Conservation Guide

The LCRA provided a \$5,000 grant to the Clark County Conservation District for development of a "Backyard Water Conservation Guide" for southern Nevada. Focusing on providing education for how to install and maintain drought-tolerant landscapes, the Guide was distributed to local nurseries, chambers of commerce, public libraries, and neighborhood groups.



IMPLEMENTATION OF INNOVATIVE TECHNOLOGIES / EFFECTIVE EFFICIENCY MEASURES

Groundwater Models

From 2000 to 2002, Reclamation funded development of groundwater models and training sessions for 85 fourth grade classrooms in northern Arizona. Model development was completed in FY 2000; training sessions were conducted in 2001 and 2002.

SNWA Conservation Initiatives

The LCRA partnered with the Southern Nevada Water Authority on two conservation education initiatives: development of a Xeriscape landscaping video for southern Nevada residents and an educational publication on water conservation for local students in English and Spanish.



Xeriscape Conversion Study

From 1996 to 2002, Reclamation cooperated with the Southern Nevada Water Authority to conduct the Xeriscape Conversion Study, the largest Xeriscape demonstration project conducted to date in the West. The objective of the Study is to examine how the conversion of turf landscapes to low-water use landscapes can produce water savings and change water user behavior. A total of 499 Xeriscape conversion sites and 253 traditionally landscaped homes located throughout the Las Vegas valley participated in the Study. Landscape conversions began in 1996 and were completed in 1998. Data collection efforts began in June 1998 and continued through December 2001. Analysis of data collected shows that typical landscape conversions at single-family residences result, on average, in a 33 percent savings in annual water consumption. Per unit area savings can exceed 50 gallons per square foot. The average water savings in summer months for sites converted to Xeriscape is even higher, at 39 percent. This "real world" study provides data-supported proof that SNWA's landscape conversion program is saving a significant amount of water. By providing credible evidence of success, the Study demonstrates to public utilities elsewhere the value of similar programs, and it encourages more Las Vegas Valley residents to convert their turf to low-water use landscapes. A public workshop was held in March 2002; final study findings will be published in October 2002. In June 2002, Reclamation presented SNWA with an award for outstanding achievement in completing the Study.

Lower Colorado Region

Landscape Conversion

Since 1998, Reclamation and the National Park Service, Lake Mead National Recreation Area, have been working to retrofit two campground sites in a Landscape Conversion Project. Non-native vegetation has been removed, replaced by drought-tolerant plants, and irrigation systems have been upgraded to greater efficiencies. The Project, scheduled for completion in FY 03, will yield an annual savings of 164 acre-feet of water, or 70 percent of the amount of water used prior to the retrofits.

Horizontal Axis Clothes Washers

The LCRA provided financial assistance to the Southern Nevada Water Authority in the amount of \$10,050 to conduct a year pilot study on front-loading washing machines in the Las Vegas valley. This 1-year indoor retrofit program was very popular; the SNWA has now launched a valley-wide retrofit program to provide rebates to homeowners who “trade up” to horizontal axis washers. The machines save about a third of the water and half of the energy of standard washing machines.

Water-Efficient Plant Study

Since 1999, Reclamation and the University of Nevada-Reno have been conducting a joint research study on water-efficient plants. The objective of the Study is to add 10 new trees, 10 new shrubs, and 10 new groundcovers to the listing of sustainable, drought-tolerant vegetation for southern Nevada. Three research sites have been established, two in North Las Vegas and one in Pahrump. All plants are growing in native soils without any soil amendments or fertilizer. Organic mulch has been added to the surface, and the plots are irrigated only as needed in keeping with the project objective of identifying and analyzing plant materials that will flourish under natural conditions with the least amount of supplemental irrigation and fertilization. To date, more than 50 species of trees and plants have been tested for sustainability in southern Nevada. Most species are thriving in

drought-tolerant conditions, as defined under terms of the Study. The Study is scheduled for completion in 2003, when a final report will be published and made available to Reclamation and the interested public.

Demonstration Gardens

Since 2000, the LCRA has provided financial support to the Conservation District of Southern Nevada for development of a Backyard Conservation Demonstration Garden on 2.8 acres in Henderson, Nevada. The garden will demonstrate ways to reduce outdoor urban landscape water consumption by showing homeowners how to plan and install efficient landscape designs and irrigation systems. The Project is scheduled for completion in 2002.

In 2001, the LCRA partnered with the Washington County Water Conservancy District in St. George, Utah, for development of a conservation demonstration garden. The 2+ acre garden will feature a raised vegetable garden, a fragrant garden, an edible garden, a wildlife garden, cactus and succulents, groundcovers and slope plantings, turf selection with information on water use, and container gardening. Educational features of the garden will include compost and soil amendments, a weather station, demonstration of Best Management Practices for irrigation and landscape established by the American Water Works Association, “hardscaping,” and a patio garden which will serve as an outdoor classroom. The Project is scheduled for completion in 2003.

Conservation Plan Implementation

Reclamation assisted the City of Lake Havasu with implementation of its conservation plan by providing financial assistance to conduct a leak detection program and provide educational materials to the City's 22,000 water customers.





The Major Theme: Balancing Diversity Through Partnerships

The vast expanse of PXXAO encompasses the entire range of water use, from the irrigated fields of the Navajo Nation and the counties of Pima, Pinal and Maricopa, to the urban sprawl of Phoenix and Tucson. These diverse cultures and economies utilize various water sources: the Colorado River, other watersheds, and ground water. Balancing such variety requires close cooperation between Reclamation, the State of Arizona, Native American tribes and local water districts. Consequently, the five year history of water conservation in PXXAO marks the progress of partnerships.

Numerous programs for technical assistance, planning consultation, demonstration and educational outreach have been made possible through the spirit of cooperation. A case in point: because Reclamation recognized the interlocking management issues between Arizona's critical groundwater situation and the use of federal Colorado River water, PXXAO gladly sponsored the purchase of ground water models for use by Arizona Resource Conservation Districts in their environmental education centers.

Another example: Reclamation purchased 330 water conservation book sets of 20 books each for school and public libraries in Phoenix, with titles addressing different age groups and content spanning the spectrum of opinion about water use. The objective is to attain an informed dialog about water conservation, for dialog is the foundation of partnerships not only amongst public agencies, but also between those agencies and the public they serve.

You can trace the evolution of diverse partnerships in the year by year account of PXXAO accomplishments.

Lower Colorado Region

Phoenix Area Office

EDUCATION AND INFORMATION

Sponsor and participate in the Tucson Children's Museum Earth Day parade and festival. Reclamation has provided support and participated in the event since 1996. In 2002, more than 4000 people attended the event.

Arizona Historical Society Museum

Reclamation provided financial assistance for the development of water conservation information and displays along the papago greenline, adjacent to the museum.

Management Improvement Program (MIP)

Continued support for the Pinal County Area MIP. Partners include: Central Arizona College, Central Arizona Project, Pima County Cooperative Extension, Farm Service Agency, the Maricopa-Stanfield Irrigation and Drainage District (MSIDD), Natural Resources Conservation Service, Pinal Active Management Area (AMA), West Pinal Natural Resources Conservation District (NRCD).

Irrigation Management Workshop

Sponsored an Irrigation Management Workshop for federal, state and local agencies, as well as irrigators. There were 20 attendees at the first workshop.

"Conserve This" Water Conservation Issues Conference

Sponsored a water conservation conference addressing effectiveness of conservation practices. There were 100 attendees.

Ganado Irrigators Training

Provided training for irrigators in the Ganado Irrigation Project (Navajo Nation), including 90 Farm Board members, with an estimated 40 AF/yr water saved as a result of improved practices.

Educational Water Models

Purchased ground water models for environmental education centers at 28 Natural Resource Conservation Districts and Soil and Water Conservation Districts, through an agreement with the Arizona Association of Conservation Districts. Reclamation also supported training sessions for the directors of the 28 districts and for Project WET, on how to use the models effectively. Thousands of students will learn about ground water science and conservation from these models.

Backyard Conservation Program

Supported development of a backyard conservation program specific to Arizona, in cooperation with the Arizona Association of Conservation Districts. Reclamation underwrote production of 300 videos, 3000 bookmarks, and television public service announcements that reached over 10,000 viewers.

Phoenix Water Library Book Set

Purchased and distributed books on water conservation and water science to all school and public libraries in the Phoenix water delivery area, a total of 330 book sets have been made available to approximately 350,000 students.



Project WET Water Festival

Sponsored the National Project WET Water Fair. About 1000 students participate and benefit from this educational opportunity each year. The location of the Fair changes each year. The first festival in 2000 was held in Tucson. The 2001 festival took place in Mesa and the 2002 festival will be in Scottsdale and will include a celebration of Reclamation's centennial.

Bilingual Irrigation Videos

Assisted in the development and distribution of instructional irrigation videos. Materials are provided in Spanish and English.

Adopt a Desert View Festival and Calendar Contest

Sponsored and participated as an exhibitor at the City of Mesa's event. Reclamation supported an art contest which resulted in the publication of a conservation-themed calendar. 15,000 calendars are printed and distributed each year.

Casa Del Agua (House of Water)

Partnered with the University of Arizona to provide field trips for 300 students to the Casa Del Agua water conservation demonstration house in Tucson.

Water Conservation Public Service Announcements

Provided funding to the Tucson Active Management Area for ten public service announcements on Tucson area television, reaching approximately 25,000 viewers.

Mobile River Study Center

Partnered with the Coronado Resource Conservation District to purchase two mobile river study centers to be used for public education and demonstration, with presentations reaching more than 1000 people each year.

Navajo - Kerley Valley

Developed water management and conservation plan for the Kerley Valley Irrigation Project, which includes creation of a water users association for 50 irrigators.

DEMONSTRATION

Mesa Xeriscape Demonstration Garden

Provided a grant for upgrading and enhancing the demonstration garden at Mesa Community College, attended by 23,000 visitors annually.

Dual Metering Project

Funded purchase and installation of both indoor and outdoor water meters for 100 residences in three housing developments. Dual metering allows long term comparison of indoor and outdoor water usage, thus better identifying the potential for water savings.

Water on the Web

Supported development by the Community Water Company of Green Valley of a web site where the 1,000 customers of the company can each check their own water usage and see how they compare to other users overall. The web site also furnishes water conservation tips and information.

Mesa Community College Xeriscape Demonstration Garden

Funded new signs for the existing garden, attended by 23,000 visitors annually.

Our Yard Landscape Learning Center

The center provides information and demonstrates best practices for residential landscaping in the desert environment, utilizing local climate, soils and vegetation. Reclamation sponsored the program by providing funding for new exhibits. The Center has about 15,000 visitors annually.



Lower Colorado Region

PLANNING AND IMPLEMENTATION

Navajo - Kerley Valley

Developed water management and conservation plan for the Kerley Valley Irrigation Project , which includes creation of a water users association for 50 irrigators.

Neighbors Helping Neighbors

Supported the Neighbors Helping Neighbors plumbing and retrofit program for high usage, low income homes. In two years, 266 toilets were installed in low-income / high-usage homes, resulting in an estimated savings of 19 AF/yr.

St. David's School

Provided financial assistance for the refit of St. David's School with waterless urinals.

Ultra Low Flush Toilet Long Term Study

Funded research evaluating the durability and water usage of older low flush toilets.

Mobile Laboratory Program

Assisted seven Natural Resource Conservation Districts (NRCDS) in providing investigations of irrigation water efficiencies. Participating districts included the Agua Fria-New River, the Buckeye-Roosevelt, the East Maricopa, the West Pinal, the Eloy, the Florence-Coolidge, and the Pima. Collectively, the districts provided 70 on farm assessments each year for an estimated water savings of 12,000 AF per year.

Salt River Pima-Maricopa Indian Community (SRPMIC)

Reclamation provided technical assistance in the development of a distribution system model. The program provided SRPMIC with the information needed to improve water measurements in their system, estimated water savings of 5,000 to 7,000 acre-feet per year.





The Major Theme: United in Common Purpose

The metroplex of southern California is knitted together by aqueducts and reservoirs, an integrated system for water diversion, storage and delivery even more important to the region's identity than its infamous freeways. Water agencies in the Southern California Area are also united by a shared requirement- complying with federally mandated reductions in the use of their primary water source, the Colorado River. Reclamation has joined with water agencies to make this challenge a positive goal: improving the quality of life through water conservation.

When low income residents received Reclamation-funded ultra-low-flush toilets, they not only upgraded an important household plumbing fixture, they became part of a citizenship effort to provide solutions. When young people were trained in water conservation with the help of Reclamation support, they not only assisted with a public program, they acquired skills and knowledge that will advance their careers.

A goal initially framed as "making do with less" has matured to become "making less into more." Progress toward full attainment of cost-effective Best Management Practices has brought an awareness, participation and sense of pride that are worthy goals in their own right.

Water agencies with better water budgets, better demand forecast models and better planning are better able to serve their customer's needs, thanks to Reclamation grants. And Reclamation financial assistance has made sure that environmental groups can participate in the development of a water use efficiency certification program for the California Urban Water Conservation Council.

Lower Colorado Region

Southern California Area Office

WATER CONSERVATION PLANNING

Retail Demand Forecasting

In partnership with the Municipal Water District of Orange County (MWDOC) and 32 Retail Agencies throughout Orange County, Reclamation initiated development of mathematical models that will forecast consumer demand for water, thus providing guidance for implementation of targeted water use efficiency measures.

California Urban Water Conservation Council

With over 100 signatory agencies, the CUWCC is the key facilitator of urban water conservation planning and implementation in California. They will sponsor workshops and conferences, technical assistance, water audits, and system leak detection equipment, plus travel and per diem expenses for environmental group members participating in the development of the CALFED Water Use Efficiency Certification Program. The CUWCC and the BMP process it oversees are now central to existing and proposed State and Federal urban water conservation initiatives, including CVPIA, Urban Water Management Planning, California's 4.4 Plan, and CALFED Water Use Efficiency Program.

The Landscape Area Baseline Study

Using sophisticated data analysis, the Helix Water District identified sites having one acre or more of irrigated landscape and the potential for substantial water savings. Results from this analysis will be extrapolated to areas served by other water retailers throughout southern California, serving as a baseline for setting goals and incentives.

EDUCATION AND INFORMATION

Sponsored the Edible Garden and Water Alternatives exhibits for the **Water Conservation Gardening and Learning Center** at Cuyamaca Community College located in East San Diego County.

Funded a "**Water Efficient Landscape Management**" manual, in cooperation with the California Landscapes Contractors Association, the Municipal Water District of Orange County, and Irvine Ranch Water District. Publication intended for 10,000 copy distribution.

Provided support to the California Department of Water Resources for software and database upgrade of the **California Irrigation Management Information System (CIMIS)**. Eto data will be available through the World Wide Web. CIMIS provides data and information state-wide, and 51 out of the existing 102 stations are located in or adjacent to Reclamation's service areas.

Sponsor the **Annual California Water Policy Conference** for The Public Officials for Water and Environmental Reform (POWER)

Residential Indoor/Outdoor Survey And Educational Program

- 6th grade students conducted surveys of their household water usage and the potential for retrofits. Classroom and CD ROM training were used to educate the students and participating parents.

Co-sponsored the Annual Children's Water Education

Festival - Over 6,000 third and fourth grade students, teachers, and parents in attendance and provided a wonderful opportunity for Reclamation to educate the community through hands-on demonstrations about water conservation, water quality and water supply.



Co-sponsored the **Recycled Water Site Supervisor Class** in San Diego, California.

Served on the advisory board for the **Network for Environmental Science Teaching (NEST)**. This committee has partnered with the California Regional Environmental Education Coordinators Network (CREEC), a state-wide effort of the California Department of Education, to enhance the environmental literacy of teachers and students in four counties: San Bernardino, Riverside, Mono, and Inyo.



DEMONSTRATION AND IMPLEMENTATION

In partnership with the **Metropolitan Water District of Southern California (MWD)** - Completed 66 projects co-funded with MWD along with its 45 member agencies, including:

- 62K ULF retrofits
- 132 landscape surveys
- 450 moisture sensors, 35 controllers, one centralized controller on large landscapes
- 7 weather stations for water budgeting
- 256 commercial/industrial/institutional surveys
- 9450 residential surveys

Sponsored **Mobile Irrigation Evaluation Labs**, in partnership with

- the USDA Natural Resources Conservation Service, the San Jacinto Basin Resources Conservation District, and the Eastern Municipal Water District
- Riverside-Corona Resource Conservation District, City of Corona, and Western Municipal Water District
- Mission Resource Conservation District and San Diego County Water Authority

Supported **outdoor moisture sensor study program** with Southern California Water Company.

In partnership with Reclamation, MWD initiated a new **Commercial, Industrial and Institutional (CII)** program to achieve savings by replacing old high-water-use fixtures and equipment with new water conserving fixtures and equipment in CII facilities. The program targets specific end-uses yielding the highest annual lifetime water savings.

Residential High-Efficiency Clothes Washer Incentive Program-

Offered water customers in San Diego County Water Authority's service area a financial incentive to replace water-wasting clothes washers with water-efficient machines that use 30% less water per load and significantly less energy.

Lower Colorado Region

Residential Controller Retrofit And Evaluation - The Riverside-Corona Resource Conservation District (RCRCD) provided and installed multi-programmable landscape sprinkler controllers in fifty homes.

Ultra Low Flush Toilet (ULFT) Distribution And Recycling Program - Eastern Municipal Water District successfully implemented an ULFT Program utilizing a community-based organization and involving all of the high schools within the Eastern service area. Over 2,000 ULFT units were given away to low and fixed income groups, resulting in the projected savings of 1,134 acre-feet of water over the estimated 15 year life of the toilets.

Additionally, **Reclamation purchased 1,600 toilets for the initial year** of a ULFT program conducted by the West and Central Basin Municipal Water Districts. The ten year program will eventually replace 15,900 toilets with ultra-low flush models, saving 620 acre-feet. The distribution will utilize the community-based organizations, ExPert and the Old Timers Foundation.

Precision Irrigation Scheduling Method (PRISM) Program - The San Jacinto Basin Resource Conservation District (SJBRCDD) Mobile Lab used the PRISM system to provide season-long soil moisture monitoring and computerized irrigation scheduling services to participating vineyards in the Temecula Valley wine grape growing region.





The Major Theme: The Measure of Sustainability

When the Water Conservation Field Services Program began in the Yuma Area over five years ago, many irrigators were asking why they should change their ways when there seemed to be few incentives for doing so. After all, they possessed priority entitlements to the Colorado River, so the supplies were both guaranteed and more than ample. Lavishing water upon arid soils was the way to make the desert bloom.

It took technology to illustrate the true nature of the problem. Sophisticated soil sampling methods demonstrated that over-irrigation was threatening the very sustainability of agriculture in Southwestern Arizona and Southeastern California.

Inundated soils were losing their fertility to the accumulation of toxic salts. The problem was not water shortage, it was water excess. Unless major changes were made in the management of water, the economic cornucopia of the region could collapse within decades.

The YAO is promoting the solution: technology for precision measurement and control, assuring that just enough water is delivered at just the right time under the climate conditions of the moment. By making its case through educational outreach, partnerships, grants, demonstration projects, technical assistance and good old-fashioned dogged persistence, the message has trickled into the regional awareness like drip irrigation, steadily and effectively. Now the incentive for water conservation is clearly seen— it is the only way to sustain the region's economy and way of life for the centuries to come.

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Yuma Area Office

ACCOMPLISHMENTS

THE YUMA AREA

The Yuma Area is a predominately agricultural area. So in the first five years, the Yuma Area has primarily focused on agricultural water management with the Field Services Program.

STRATEGY FOR AGRICULTURAL WATER CONSERVATION

The long-term strategy for implementation of agricultural water conservation is composed of the following practices:

- Water Measurement
- Canal Modernization
- On-Farm Irrigation Water Management, and
- Soil Salinity Management

Agricultural water conservation cannot be realized to its potential with one of these practices alone. With agriculture, all four must be implemented in order to realize the full potential for water conservation are dependent upon one another. The long-term strategy must include all four practices to be successful.

In order to carry out this strategy, the Yuma Area uses the four elements of the Field Services Program:

- Conservation Planning
- Education and Information
- Demonstration, and
- Implementation

CONSERVATION PLANNING

Thirteen districts in the Yuma Area who were required by law to submit water conservation plans. All thirteen **(100%) have submitted plans** that have met criteria for a water conservation plan. Workshops, guidance, review, and references have been provided to all districts.

In addition, all districts were offered **direct technical assistance** through the Field Services Program to complete their water conservation plans. Direct assistance was provided to nine of the thirteen districts that were required to complete plans.

Conservation planning assistance was provided to other entities and water users who are not required to complete plans including: **five Indian Tribes** (Cocopah, Quechan, Chemehuevi, Mohave, and Colorado River Indian Tribes); **and two federal agencies** (U.S. Fish & Wildlife Service, U.S. Dept. of Defense); and **one state agency** (Arizona State Land Dept.)

EDUCATION AND INFORMATION

Joint Urban Irrigation Conservation & Education (JUICE):

Support for program with the Master Gardener program with the Yuma County Cooperative Extension Service. Education and materials for efficient use of landscape water was incorporated into the Master Gardener program. In addition, **Mobile Kiosks and Displays and an Internet Web Site** for water conservation landscaping in Yuma County were supported.

"Outdoor Classroom" at Arizona Western College: The Outdoor Classroom is a small (12 acre) farm used for education of agriculture students at Arizona Western College. Assisted the College with construction of three types of irrigation systems.



DEMONSTRATION and IMPLEMENTATION

Water Measurement:

Water Measurement is the foundation of all other agricultural water management measures. You cannot manage well what you do not measure accurately. The Yuma Area Office has **fifteen cooperative programs with irrigation and conservation districts** to demonstrate and implement improved water measurement practices. Our emphasis is on the implementation of **long-throated flumes** and new technology for flume recorders and **acoustical-doppler water measurement** devices.

Canal Modernization:

Canal Modernization is a pre-requisite to improved on-farm irrigation water management. In order for a farmer to manage his or her water well, their water must be delivered in a uniform, accurate, and timely manner. The Yuma Area office has five cooperative programs with irrigation districts and tribes to demonstrate and implement new technology for canal control and management. Measures include: **Supervisory Control and Data Acquisition (SCADA); modification of existing canal control structures; and stand-alone automated turnouts and recorders.**

On-Farm Irrigation Water Management:

Most of the Yuma Area is irrigated with surface, gravity irrigation. Surface irrigation can be very efficient but the irrigator must use skill in applying the right amount of water at the right time. New computer software has enabled field researchers to model local surface irrigation condition and produce methods for determining the optimum time to cut off irrigation water flow to a field. Four **"cut-off time" studies** have been completed and two **outreach programs** are in effect.

A **computer program for irrigation scheduling** is being developed in cooperation with the University of Arizona. "AZSCHED" will be ready for a first release next year. Support has also been provided for two **irrigation mobile labs**.

Soil Salinity Management:

It is estimated that around 15% of the water used in the Yuma Area may be needed for control of soil salinity- but how much water to apply and where to apply it efficiently has always been a difficult thing to quantify in the field. **New technology for soil salinity assessment** has been developed by the USDA- Agricultural Research Service (ARS) to quickly and accurately assesses the soil salinity conditions across a field. This new technology is being demonstrated and applied by five local districts and action agencies in the Yuma Area.

- University of California, Holtville Station for runoff reduction and irrigation demonstration - Imperial Valley.
- Coachella Valley Water District for three CIMIS stations (California Irrigation Management Information Service)
- Unit "B" Irrigation and Drainage District for low-cost canal automation demonstration
- University of Arizona, Yuma Agricultural Center, for irrigation water management study and demonstration with alfalfa
- Colorado River Indian Tribes for Water measurement improvement & demonstration and
- installation of SCADA & automation.
- Bard Water District for water measurement demonstration.
- Yuma-Mesa Irrigation & Drainage District for Irrigation Management Service & No-rust slide gate demonstration.
- Bard Water District for canal automation demonstration - Ypsilanti canal headworks.
- University of California Cooperative Extension for Palo Verde alfalfa drydown study.
- University of Arizona, Yuma Agricultural Center for Yuma & Wellton-Mohawk Valleys Irrigation Water Management Study & Demonstration.
- Coachella Resource Conservation District for irrigation evaluation Mobile Lab.
- University of California Cooperative Extension for alternative forage crop demonstration at Holtville & Palo Verde (some testing in Arizona).

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- Yuma Irrigation District for canal automation demonstration - South Gila Canal headworks.
- Unit "B" Irrigation & Drainage District for water measurement improvement and demonstration.
- California Department of Water Resources for CIMIS Station, Ripley, Palo Verde Valley.
- University of Arizona, Yuma Agricultural Center for irrigation water management study and demonstration for citrus on the Yuma-Mesa landform.
- Coachella Valley Resource Conservation District for salinity assessment and diagnosis, demonstration of new technology.
- University of Arizona , Yuma Agricultural Center for salinity assessment and diagnosis, demonstration of new technology.
- Wellton-Mohawk Conservation District for AZMET (Arizona Meteorological Service) Station
- Mohave Valley Irrigation and Drainage District for water measurement improvement and demonstration.
- Imperial Irrigation District for salinity mapping and assessment demonstration project
- City of Yuma for their Water Conservation Plan.
- Yuma County Water Users' Association for water measurement improvement & demonstration.

1999 Memoranda of Agreement

- University Of Arizona, Maricopa Center for AZSCHED (Arizona Irrigation Scheduling) computer program via the Internet
- Coachella Valley Water District for water use survey partnership agreement, Part A - Determining reasonable, beneficial use
- Palo Verde Irrigation District (PVID) for CIMIS Station - North Palo Verde Valley
- Interagency Agreement with Bureau of Indian Affairs, Colorado River Agency for construction of water measurement structures.

1999 Grants

- Parker Valley Natural Resources Conservation District for salinity mapping and assessment demonstration project.
- Parker Valley Conservation District for irrigation evaluation and education Mobile Lab.
- University of Arizona, Cooperative Extension for JUICE (Joint Urban Irrigation Conservation Education) with Master Gardeners.
- University of Arizona Yuma Agricultural Center for water conservation kiosks and displays.
- Arizona Western College Outdoor Classroom for Water Resource Education – Drip system & weather station.
- Palo Verde Conservation District for irrigation water management program.

2000 New Cooperative Agreements

Developed and signed seven cooperative agreements for water conservation for 50/50 partnerships with local districts and agencies. Obligated \$333,910 to match local contributions.

New water measurement agreements include the Fort Mohave Indian Tribe and US Fish and Wildlife Refuges along the Colorado River. A fifth soil salinity assessment demonstration was started, thus providing demonstrations of new technology for soil salinity management in all the major agricultural districts in the Yuma Area. An interagency agreement with USDA-ARS was initiated in order to furnish public information on soil salinity management.

Existing agreements were extended and modified to provide water measurement structures in the Bard Water District, and continued sponsorship of the Coachella Valley RCD Mobile Lab. A new agreement was initiated with California Polytechnic State University, Irrigation Training and Research Center (ITRC), for technical assistance to Yuma Area's districts.



CONSERVATION PLANNING

2000

Six draft water conservation plans were received, reviewed and revised by Reclamation in cooperative working arrangements with the districts:

- Unit B Irrigation and Drainage District
- Yuma Irrigation District
- Bard Water District
- Mohave Valley Irrigation and Drainage District (*agricultural plan only*)
- Gila Monster Farms
- City of Somerton

In FY2000, only two municipal plans and one agricultural plan remained to be submitted in order to achieve 100% compliance in the state of Arizona. The only remaining plans to be completed in California were the three largest agricultural districts.

(Completion of their plans was delayed by agreement on a plan for California to stay within its Colorado River entitlement).

2001

Three Districts completed five-year water conservation plans in FY2001:

- Coachella Valley Water District
- Cibola Valley Irrigation and Drainage District
- Palo Verde Irrigation District

Reclamation provided review and comments on the Coachella Valley plan. Reviews will be completed on the other Cibola Valley and Palo Verde in fiscal year 2002.

Two districts have submitted draft water conservation plans:

- City of Yuma
- Imperial Irrigation District

Reclamation will provide comments on these draft plans early in FY2002. It is expected that both Districts in FY2002 will complete a final plan.

Completion of these final two plans will result in 100 per cent compliance with the legal requirement for plans in the Lower Colorado Region.

CONSERVATION PROGRAMS

2000

Water Measurement

New water measurement structures were built in the Bard and Unit B, districts, and on the Colorado River Indian Reservation. The Yuma Area Office provided design services for five new structures in these districts. Two new models of Acoustic Doppler Flow Meters (ADFM) were installed in the Yuma Mesa Main Canal and evaluated for use. Preparatory work was completed for a demonstration of new technology for flume recorders and totalizers in the Mohave Valley.

Canal Modernization and Automation

In cooperation with the Bureau of Indian Affairs and the Colorado River Indian Tribes (CRIT), 80% of the work on the CRIT Supervisory Control and Data Acquisition (SCADA) system was completed. In cooperation with the ITRC, SCADA plans were completed for the Yuma County Water Users' Association and the Yuma Irrigation District. A demonstration project for a low-cost, water level alarm system for small districts was installed in the Unit B Irrigation District.

On-Farm Irrigation Water Management

A runoff reduction demonstration was completed in the Imperial Valley by the University of California. In cooperation with the University of Arizona, two irrigation studies were completed on the Yuma Mesa, to determine an easy-to-use, irrigator-friendly method to determine irrigation cut-off time. A similar study is nearly complete in the Yuma Valley, with a final report due in December 2000. Plans and preparations were made to follow

up these studies with outreach and extension programs. An alternative forage crop study by the University of California was 75% complete at the end of FY2000. This study will provide information about alternative forage crops that are comparable in quality to conventional forage crops but use less water. An Internet based irrigation scheduling program "AZSCHED" is being written by Reclamation in cooperation with the University of Arizona. It was 90% complete at the end of FY2000. Reclamation continued to fund 25% support for the Mobile Lab operated by the Coachella Valley Resource Conservation District.

Soil Salinity Management

Five demonstrations of new technology for soil salinity management were active in the Yuma Area. The goal of these demonstrations was to promote adoption of this new technology by the private sector. Reclamation has generated substantial interest among the public and agricultural service companies. A technical conference with the five sponsors and the USDA-Agricultural Research Service was held in November 2000 to discuss how Reclamation and its partners can be more effective in delivering expertise and technology for salinity management.

2001

Demonstration of Innovative Technologies

Innovative technologies are being "tried and tested" in the field in five areas of emphasis:

1. **Water measurement:** Long-throated flumes are recommended for improved water measurement wherever they can feasibly be used. For locations where long-throated flumes cannot be used, new technology for water measurement using Acoustic-Doppler Flow Meters (ADFM) is available. Reclamation has installed two new ADFM devices in major canals for demonstration, and purchased two more for installation early in FY2002.

2. **Canal Modernization:** A low-cost, water level alarm system is being demonstrated and evaluated in the Unit B District, and another is planned for the Bard District. A new, low-cost technology for totalizing flow rates and controlling the rate of delivery to a lateral was installed for demonstration in the Bard District, and two more are planned for FY2002. Two new devices for totalizing the flow rate over a flume were installed for testing on the Fort Mohave Indian Reservation, and four similar, commercially available devices were installed for demonstration and testing in the Mohave Valley District.

3. **Irrigation Water Management:** In cooperation with the University of Arizona, irrigation water management tools and techniques currently under development are close to "field tested and ready" status. Irrigator-friendly, easy to use methods for determining irrigation cut-off time in the Yuma-Mesa area have been completed, and funding provided for field-testing and a follow-up outreach program. A similar study for the Yuma Valley was completed in FY2001, with an outreach program planned for FY2002. "AZSCHED" is a computer program for irrigation scheduling using actual weather data on the Internet. AZSCHED is being updated and written for today's computers. The new version advanced to the field-testing stage this year. A surge irrigation demonstration by the University of California was supported in the Imperial Valley.

4. **Salinity Management:** New technology for salinity assessment and management is under demonstration in five locally sponsored programs, with technical support from USDA-Agricultural Research Service (ARS) and Reclamation. The Lower Colorado Region-Salinity Assessment Network (LCR-SAN) consists of all five demonstration programs, ARS, and Reclamation. LCR-SAN conducted a technical conference in FY2001 to discuss issues, problems and directions for future efforts. There is a growing awareness of soil salinity and water management related



problems, and there is increased interest in the use of new technology to address these problems. Fiscal year 2002 will start with another LCR-SAN conference for furthering discussion of improved technologies and new applications.

5. Alternative Forage Crops: The alternative forage crop demonstration and study conducted by the University of California was completed in FY2001. An outreach program will follow in FY2002. Alternative crops using considerably less water than traditional forage crops have the potential of providing comparable benefits to farmers, the economy and the environment.

Implementation of Conservation Measures:

Districts in the YAO continue to move ahead in a positive direction. Improved water measurement is the key, the essential and fundamental management measure to implement. In order to manage water well, one must first measure it well. To that end, Reclamation's YAO implementation program focuses heavily on water measurement. In FY2001, Reclamation provided technical assistance for water measurement to ten districts, tribes, and agencies, resulting in the installation of at least 30 water measurement devices of various types and sizes. Districts are taking to heart lessons learned from previous water measurement demonstrations and implementing their own water measurement programs.

Canal modernization programs are continuing in the Colorado River Indian Tribes and the Yuma County Water User's Association. Implementation of Supervisory Control and Data Acquisition (SCADA) systems and modernization of water scheduling and ordering systems made significant progress in these districts. A new cooperative agreement was signed for implementation of SCADA in the Yuma Irrigation District.

PUBLIC INFORMATION AND EDUCATION PROGRAMS

2000

The Yuma Area Office presented its water conservation display at four county fairs in FY2000. The exhibit included Reclamation's water measurement model, a miniature automated gate, and informative brochures. YAO set up a water conservation booth at the US Army Yuma Proving Ground and the City of Yuma "Earth Day" celebrations, and at the US Marine Corps Air Station energy fair. The Yuma Area Office publishes a quarterly water conservation newsletter with a mailing list of about 200, in order to keep water users informed about water conservation programs.

2001

YAO FY2001 accomplishments in water conservation education include:

- Continuation of the YAO quarterly water conservation newsletter.
- Water conservation displays and booths at Yuma and Imperial County Fairs, and City of Yuma Earth Day.
- Newspaper articles in the Yuma Daily Sun and Desert Farm & Ranch.
- Brochure development and distribution for the Lower Colorado River Salinity Assessment Network (LCR-SAN).
- New Internet page for the Yuma Area Office water conservation program.
- Support for University of Arizona Cooperative Extension water conservation education programs, including mobile water conservation kiosks and displays, and the Joint Urban Irrigation Education program for landscaping.
- Support for completion of an "Outdoor Classroom" at Arizona Western College, a small working farm where students can learn "hands-on" about irrigation water management.
- Presentations on water measurement at Crop Advisor's meeting, two district board meetings, and a water measurement lab at Arizona Western College.



